As I explained in my direct testimony at 46, *had Dr. Christensen substituted economy-wide input price growth for actual LEC input price growth in his 1984-92 study,* input *quantity* growth would have been commensurately lower (by about 2.6% per year) while the resulting TFP growth calculation would be higher by roughly 2.6%, i.e., it would have been found to be growing by about 5.2%.[12] Had Dr. Christensen utilized economy-wide input price growth rates within his study, he would have obtained *lower* input *quantity* growth than he calculated by using the LEC-specific input price movements. The lower rate of *input quantity growth,* when compared with the *output quantity growth rate* that Dr. Christensen had calculated, would have resulted in a *higher overall LEC TFP* result, but in one that would have then been consistent with Pacific's assumption — that LECs confront economy-wide input price movements — that underlies its application of the TFP result to the X-factor. While the *correct* approach is to use LEC input prices *in both the TFP calculation and the application of the TFP to the X-factor,* had Dr. Christensen at least used the *economy-wide* input price rates *consistently* in both places (which he did not), he would still have obtained approximately the correct X-factor value.

Pacific's position on pricing flexibility as a means of responding to competitor pricing initiatives is fundamentally at odds with its persistent denial that LEC input price growth differs from economy-wide changes.

Q. How does Pacific's contention that long-term LEC input price movements (which it contends track economy-wide input price movements) are applicable to the overall NRF

12. The 5.2% is calculated as the sum of the Christensen LEC TFP value based upon LEC input prices (2.6%) plus the differential between the average LEC input price growth rate and the average growth rate for GDP-PI (also, coincidentally, 2.6%).

price adjustment mechanism square with the specific pricing flexibility proposals that the Company is seeking in this proceeding?

A. There is a fundamental and an ironic inconsistency, which in part belies Pacific's claims as to the actual extent and effect of competition in the California local exchange service market. Pacific is proposing, first, that the overall price adjustment formula be modified in a manner that will allow Pacific additional revenues of between 2% and 3% per year relative to the present NRF.[13] Because Pacific will not be required to flow-through to its customers any of the real decreases in the cost of its inputs that amount to some 2.6% per year, the Company will generate an additional $150-million or so in windfall revenues in each year, compounded such that, over a four-year period, roughly $1.5-billion in windfall revenues will have been generated.[14]

If Pacific were confronting actual, price-constraining competition, its competitors, responding to *current* input price conditions (and irrespective of long-term trends) would bid down their prices to reflect the reduced cost of their inputs, thereby preventing Pacific

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13. Pacific has offered two alternative proposals for revising the NRF price adjustment mechanism. Under its "preferred" plan, the GDP-PI – X formula would simply be eliminated for Category 1 services and would be replaced by a price freeze, which is arithmetically equivalent to setting the X-factor equal to GDP-PI, or roughly 3%. Alternative, Pacific suggests that if the formula is to be retained, the X-factor should be set equal to long-term LEC TFP growth, which Dr. Christensen asserts is 2% per year. The current X-factor applicable to Pacific is 5% per year.

14. Pacific's intrastate revenues are roughly $6-billion. 2% of that amount, or $120-million, will be generated in the first year if the X-factor is eliminated. In the second year, another $150-million (roughly) will be added, producing a total windfall of $300-million, for that year, or $450-million cumulatively over the two years. Extending this over a four-year period, the total cumulative windfall revenue will grow to approximately $1.5-billion.

from realizing this windfall. Of course, if no such price-constraining competition develops in the immediate future, Pacific will have no reason to flow-through to its customers any of the input cost decreases that it enjoys. As I stated in my direct testimony at 6-11, such effective competition is not likely to rapidly develop in the foreseeable future.

At the same time, Pacific is requesting that it be permitted to "flexibly price" all services that are "subject to competition" — i.e., those for which legal bars to entry have been removed. This would permit Pacific to surgically target and lower its prices for specific services that confront competition, and offset these lower prices by *raising* prices for those services that do not yet face price-constraining competition.[15] By escaping the *regulatory* requirement to flow through short-term real input price decreases in its *non-competitive* services, Pacific acquires the ability either to retain these cost decreases as additional profit or, if compelled by market conditions, to use the windfall to fund selective, targeted rate decreases where competition is present *and where its competitors' ability to reduce their own prices is in part due to the lower input prices that they (like Pacific) confront.* It is ironic that Pacific both denies the presence of short-term input cost effects while at the same time insisting upon the right to respond to competitive price decreases *which may themselves be the result of competitors flowing-through the very same input cost effects that Pacific claims do not exist.*

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15. As I discuss below, and contrary to claims advanced by Drs. Harris (for Pacific) and Sappington (for GTEC), the mere lifting of legal entry barriers is not in and of itself sufficient to constrain or otherwise control the dominant incumbent LECs' exercise of market power. For that to happen, *effective* competition must be established, and that cannot be expected to arrive overnight.

The LECs persist in overstating the potential impact of competition upon their productivity, profitability and growth merely because local entry barriers may soon be lifted.

Q. Dr. Selwyn, in their report attached to Dr. Schmalensee's testimony, Pacific consultants Schmalensee/Taylor/Tardiff contend that the entry and growth of competition in the intraLATA toll and local services markets will result in lower overall productivity growth for Pacific Bell in the future. Do you agree with their assessment?

A. No, I do not. Schmalensee/Taylor/Tardiff posit a linkage between LEC output growth and LEC productivity growth. They contend that a high rate of output growth enables LECs to achieve greater productivity gains and, conversely, that slow or no growth in output will result in correspondingly lower productivity improvements.

Reduced to its core, this theory rests on the notion that, due to pervasive economies of scale and scope in the local telephone business, the introduction of competition will reduce overall efficiency and therefore diminish overall social welfare. Indeed, if the Commission accepts the Schmalensee/Taylor/Tardiff position that competition will decrease productivity overall, it should never have — and should not now — allow competition to encroach upon the traditional LEC monopoly.

Of course, the Commission's and the California Legislature's expectations regarding the effects of competition are fundamentally at odds with the Schmalensee/Taylor/Tardiff picture. While short-run static losses in efficiency may arise *if the erosion of demand for LEC services occurs so rapidly as to idle significant amounts of embedded plant*, in the

long run competition is expected to stimulate efficiencies and innovations that would not arise under a single-producer market structure, such that the *dynamic gains* resulting from the development and growth of competition are expected to easily outweigh any short-term *static losses* of the type alluded to by Schmalensee/Taylor/Tardiff.

Q. Nevertheless, is it reasonable to expect such static losses, even in the short-run?

A. No, not necessarily. As I noted in my direct testimony at 6-8, despite market share erosion down to about 60% in the period since the break-up of the former Bell System, AT&T's aggregate traffic volume and interexchange service revenues *net of access charge payments to LECs* has continued to grow — and by significant amounts: Revenues (net of access charges) grew by 63% between 1984 and 1994, representing an annual growth rate of approximately 5%, and during the same period, aggregate AT&T minutes of use grew by 117%, or 8.1% annually.[16] Even if Pacific does not realize a comparable growth in demand for its services despite market share loss, it should still be more than capable of adjusting its cost structure to correspond with whatever change in overall demand that it does experience. As I also noted in my direct testimony at 11, Pacific is replacing embedded plant at so rapid a rate (some 9% per year) that it can easily accommodate any diminution of growth that may occur as a result of competition.

16. FCC Industry Analysis Division, *Long Distance Market Shares*, April, 1995, Table 2; FCC CC Docket 80-286, *Joint Board Monitoring Report*, May, 1995, Tables 4.8, 4.9, 4.11 and 4.12. This calculation is based upon an estimate of the change in AT&T terminating switched access minutes for the ten year interval from 4Q84 to 4Q94.

Transitional effects of competition upon LEC output growth and productivity, to the extent they may exist, should not be considered in developing price cap parameters.

Q. What data do Schmalensee/Taylor/Tardiff offer in support of their contention that the rate of output growth has declined since the onset of NRF?

A. They cite pre- and post-NRF output growth figures which, they contend, suggest that (a) the rate of "telecommunications industry" output growth is declining generally for the US as a whole, and (b) that the decline is California (where "telecommunications industry" output growth had exceeded the national average prior to 1990) is even greater than the decline in output growth that had been experienced by the "telecommunications industry" at the national level.[17] However, the data they cite appears to be somewhat inconsistent and, in any event, clearly does not reflect conditions for California's "telecommunications industry," only those for Pacific Bell.

In fact, they do not define precisely what is included within the "telecommunications industry" for which the output growth conditions are being presented.[18] However, it is clear from their testimony that the *California* "industry output growth" figures are limited to Pacific Bell's own results, and exclude all other industry players.[19] Thus, the "California" industry growth data that Pacific has offered is necessarily net of any

17. Schmalensee (Pacific), Attachment 1, at 15-16.

18. CCLTC Second Set of Information Requests, item 20, which was served on Pacific on September 11, 1995, specifically asked that the industry definition and sources of the output growth figures be provided. As of September 18 when this testimony was completed, Pacific had not responded to these specific requests.

19. Schmalensee (Pacific), Attachment 1, at 15-16, and Figure 1 at 16.

competitive losses the Company may have already suffered. *There is no evidence on this record that the overall California telecommunications industry output growth rate has declined since the onset of NRF in 1990.* Indeed, it seems difficult to reconcile the *pessimistic* picture being painted by Dr. Schmalensee with the claims of Drs. Harris and Sappington as to the rapid pace of non-LEC provider entry and growth in the California telecommunications market.

Q. In developing the appropriate price adjustment parameters for the NRF price cap formula, should the Commission consider the possible short-term impact of competition upon LEC output and productivity growth?

A. No, it should not. Any transitional erosion in output and productivity that the NRF LECs may attribute to the entry of competition should be viewed by the Commission as a "competitive loss" rather than as a long-term sea change in the LECs' productivity. The Commission was asked by the two NRF LECs in IRD to "make them whole" for such competitive losses and, as I noted in my direct testimony at 12, it soundly and correctly rejected that notion. The only difference between the present request and that advanced by the LECs in IRD is that, whereas in IRD the "competitive loss" was being expressed in specific dollar amounts, the "competitive loss" claim is here being framed as a deterioration of productivity growth that should be reflected through a lower X-factor.

Throughout the history of price cap regulation in California, the Commission has consistently maintained that reflecting short-term variations in LEC performance would have the effect of reinstating rate of return regulation. If transitional competitive losses

were to be accounted for through a decrease in the X-factor, the effect would be no different than a direct "make whole" revenue adjustment of the type that was sought by the LECs and rejected in IRD or that might have been considered in a RORR-type general rate increase application. It is indeed ironic that the same NRF LECs that erroneously characterize the decade-long post-divestiture LEC input price experience as "short term" (and on that basis argue that it should be ignored) now seek a PCI adjustment based upon an even shorter, clearly transitional *future* condition that they *allege* will occur once competitive entry barriers are lifted.

Mr. Evans' testimony misrepresents Pacific's pre- and post-NRF performance, and understates the substantial gains that Pacific has enjoyed under NRF.

Q. Dr. Selwyn, in the report attached to Mr. Evans' testimony,[20] he contends that the rewards that the Commission envisioned when it adopted the NRF have not yet materialized for Pacific, and that the Company's financial performance has actually suffered under NRF. Do you agree with these claims?

A. No, I do not. As I discussed in great detail in my direct testimony, Pacific has in fact continued to perform very well over the period of the NRF, as its financial condition and the continued strong demand for its equity securities confirm.

20. "Pacific Bell's Response to the Issues in Phase I of Investigation 95-05-047," submitted as attachment to Dennis W. Evans testimony on behalf of Pacific Bell, September 8, 1995, at 2.

Q. In Chart 4 of Mr. Evans' testimony, he compares Pacific Bell's net income with shareholder dividends as paid by Telesis. Is that an appropriate comparison?

A. No, it isn't. Indeed, there are various problems with Mr. Evans' characterizations in that chart. First, Mr. Evans incorrectly compares dividends paid *by Telesis* to *Telesis* shareholders with *Pacific Bell's* earnings, which do not include earnings by other Telesis affiliates. Pacific Bell's dividends are paid to Telesis, not to public shareholders, and are considerably higher than the dividend payments that Telesis makes to its public shareholders. In fact, Pacific Telesis has consistently retained a large portion of the dividends it receives from Pacific Bell for use in developing its various *non-regulated* businesses — which have included, most significantly, the wireless services that it recently spun off as AirTouch Corporation, a deal that produced significant benefit to Telesis and to its shareholders and, if anything, *negative* benefits for Pacific Bell ratepayers. Since 1984, Pacific Telesis has retained about $2.86-billion out of the $11.25-billion in dividends it received from Pacific Bell. During the post-NRF 1990-94 period, Telesis retained about $800-million out of the $5.18-billion in dividends it received from Pacific Bell.

Secondly, Mr. Evans' portrayal of dividend growth (or, as he claims, lack thereof) is misleading. Chart 4 in Mr. Evans' attachment would appear to suggest that pre-NRF dividends were growing steadily but, when adjusted for inflation, post-NRF dividends have been essentially flat or even slightly decreasing. Mr. Evans fails to *also* adjust pre-NRF dividends for inflation which, had he done so, would have also been portrayed as essentially flat.

Figure 1 below shows the error in Mr. Evans' Chart 4 because it also adjusting pre-NRF dividends for inflation, to end-of-year 1989 dollars. As is readily apparent, the inflation-adjusted dividend growth ceased after about 1987, some two years *before* the NRF become effective. Mr. Evans' Chart 4 and the conclusions he offers therefrom present a misleading picture of Pacific *Bell*'s financial condition, and should be disregarded by the Commission.

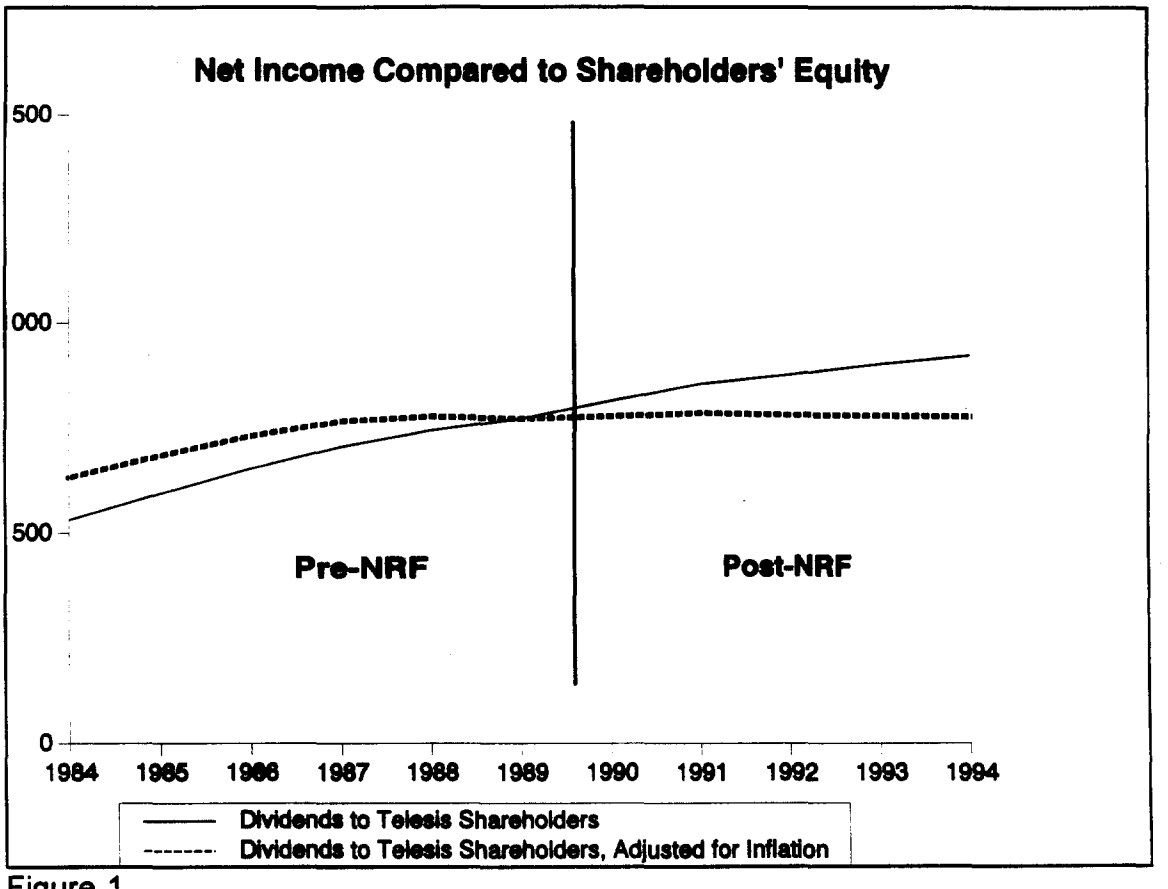

Figure 1.

Q. Does Mr. Evans' comparison of pre- and post-NRF Pacific Bell revenue growth present an accurate picture of the impact of NRF?

A. No, it does not. Mr. Evans claims that in the years prior to the commencement of NRF (1985-89), Pacific Bell's revenues grew by 7.87%, representing a compound annual growth rate (CAGR) of 1.91%.[21] According to Mr. Evans, in the post-NRF 1990-1994 period, Pacific's revenues rose by only 2.67%, representing a 0.53% CAGR,[22] leading Mr. Evans to conclude that Pacific has fared more poorly under NRF than under the previous RORR regime. This comparison is also misleading, because Mr. Evans incorrectly attributes the entirety of the $391-million rate decrease ordered by the Commission for the 1989 test year in D.89-12-048 as a *post-NRF* event.

Q. Why is that incorrect?

A. In Phase II of I.87-11-033, the Commission developed and adopted the New Regulatory Framework, but it also established a new "market-based rate of return" of 11.5% for Pacific and GTEC and ordered *pre-NRF* rate adjustments *based upon a 1989 test year* to achieve this prescribed earnings levels. Accordingly, the bulk of the $391-million PacBell rate decrease, even though it took effect in January, 1990, was not itself part of NRF. A more appropriate comparison of pre- and post-NRF revenue performance would ascribe that rate decrease to the *pre-NRF* period.

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21. Evans (Pacific), Table 2, at 11. Note that the figures provided in Table 2 do not correspond precisely with the 2.8% 1984-89 CAGR cited at page 10 and in Chart 2 of his testimony.

22. Evans (Pacific), Table 2, at 11. Note that here too the figures provided in Table 2 do not correspond precisely with the 0.2% 1989-94 CAGR cited at page 10 and in Chart 2 of his testimony.

Of the $391-million total revenue adjustment ordered in D.89-12-048, $352-million reflected the 1989 portion of the revenue adjustment adopted by the Commission. Hence, contrary to Mr. Evans' assertions and calculations of NRF-related revenue reductions, the $391-million 1990 decrease was not a "price-cap" effect at all, but resulted from a direct application of the preexisting rate of return regulation system.

Q. How does the correct attribution of the D.89-12-048 rate decrease affect Mr. Evans' pre- and post-NRF revenue growth comparisons?

A. A correct comparison of pre- and post-NRF revenue growth should attribute the $352-million revenue decrease to the 1989 test year. Using the revenue data in Table 2 of Mr. Evans' Attachment, I have reduced the $8.685-billion shown for 1989 by $352-million, to produce an adjusted 1989 benchmark revenue level of $8.333-billion. The pre-NRF revenue growth is then reduced to 3.5%, for a CAGR of 0.86%. The post-NRF revenue growth is correspondingly increased to 7.01%, for a post-NRF CAGR of 1.36%. Thus, *contrary to Mr. Evans' claim*, Pacific Bell's revenue growth has actually *increased* in the post-NRF period relative to the experience under RORR, when the RORR-based revenue adjustment is correctly attributed to the pre-NRF regulatory regime and *not* to the effects of the NRF.

Q. Is the attribution of the D.89-12-048 rate decrease to NRF the only flaw in Mr. Evans' presentation?

A. No. Mr. Evans also failed to explain the reason for the apparent dip in earnings that occurred in 1992. That drop was not the result of NRF or business conditions generally, but was instead caused by various accounting changes and restructuring charges that were made that year, events unrelated to NRF.

Q. Do you agree with Mr. Evans characterization of Pacific Bell's financial performance as "at best, mediocre"?[23]

A. Absolutely not. Pacific Bell has performed extremely well under NRF. As I discussed in great detail in my direct testimony, investor evaluations of Pacific Telesis have not undergone any significant changes over the term of the NRF. Pacific Bell's average return on equity for the 1990-1994 period was 15%. And the Pacific Telesis market-to-book ratio has had an upward trend since 1984 (as shown on Figure 3 at page 17 of my direct testimony).

Neither Pacific nor GTEC have demonstrated a clear linkage between the potential entry and growth of competition and the specific price cap reforms that are being requested.

Q. Dr. Harris for Pacific and Dr. Sappington for GTEC both offer evidence of growing competition. Do you agree with these witnesses' portrayal of the California telecommunications market?

23. Evans (Pacific) at 12.

A. Both witnesses appear to accurately describe the intense interest being expressed by a number of firms in entering various segments of the California telecommunications market. Of course, much of that interest has yet to be converted into actions and investments. The Commission is currently considering numerous petitions for certification both as facilities-based local service providers and as resellers, and has indicated that it will act on these petitions by January 1 and March 1, 1996, respectively. Except for niche market entry that has been previously authorized and the severely handicapped intraLATA competition that was authorized as of the beginning of 1995, competition for mass-market local telephone service has yet to happen. I would note, incidentally, that in a number of other states in which legal entry barriers have been absent for some time (e.g., New York, Massachusetts, Illinois), there are still no major mass-market players other than the incumbent LECs. So in the final analysis we will have to wait and see what actually happens in California; whatever that is, however, it is not likely to create instant, price-constraining mass-market competition for the incumbent LECs.

I would offer two observations about the "competition" testimony that has been offered by the two NRF LECs. First, at page 37 of his attachment, Dr. Harris candidly concedes what everyone knows to be the case, in a simple understatement that "it is true that the markets for local exchange services are not yet fully competitive." This admitted lack of a "fully competitive" market means that the incumbent LECs can, if given the flexibility to do so, shift revenues away from those specialized services that confront price-constraining competition by raising rates for those that are "not yet fully competitive."

Second, despite the lengthy discussions of competition that both LECs offer, neither has established a clear linkage between the development of such competition and the kind of fundamental changes that they are seeking in the structure and operation of the NRF. Dr. Harris, in particular, relies upon Mr. Evans' claims as to the adverse financial impact of the NRF upon Pacific, claims that I have shown, both here and in my direct testimony, to be incorrect and misleading.

The present NRF is a reasonable back-stop to the goal of a fully competitive marketplace. It assures ratepayers a "competitive outcome" in the absence of price-constraining competition, while affording the incumbent LECs all of the flexibility and revenues they require to respond fairly to the competition that does presently exist. Nothing in the direct evidence offered by either Pacific or GTEC supports the evisceration of the NRF price adjustment mechanism that the LECs desire, and the Commission should view the NRF as a major public policy success, correct for the exclusion of input price effects in the present price adjustment mechanism, and should otherwise retain the present structure of the NRF.

Q. Does this conclude your rebuttal testimony at this time?

A. Yes, it does.

PREPARED TESTIMONY

OF

DR. LAURITS R. CHRISTENSEN

BEFORE THE

PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

ON BEHALF OF

PACIFIC BELL

INVESTIGATION NO. 95-05-047

September 8, 1995

PREPARED TESTIMONY OF DR. LAURITS R. CHRISTENSEN

Q. Please state your name, business address, and professional qualifications.

A. My name is Laurits R. Christensen. I am President of Christensen Associates, a private firm that performs economic studies for government and private clients. My business address is 4610 University Avenue, Madison Wisconsin. I studied engineering and economics at Cornell University, from which I graduated in 1964. I did my graduate work at the University of California, Berkeley, where I obtained an M.S. in statistics and a Ph.D. in economics. From 1967 to 1987, I was a Professor of Economics at the University of Wisconsin-Madison. Since 1976, I have also been President of Christensen Associates. A current resume is attached (Appendix 4).

Q. What is the purpose of your testimony?

A. In its July 19, 1995 decision, D.95-07-049, the California Public Utilities Commission (CPUC) granted, in part, Pacific Bell's request to facilitate an expeditious review of the NRF structure. In the decision, the CPUC stated that three issues will be addressed in Phase I of the expedited proceeding. The purpose of my testimony is to address

issue number 1: "Should GDP-PI minus X (inflation minus productivity factor) in the price cap formula be modified or eliminated?" My analysis is presented in the study entitled, "Telephone Industry Productivity Performance and its Implications for the Pacific Bell Price Cap Formula," dated September 8, 1995. A copy of the study is attached.

Q. Does this complete your prepared testimony?

A. Yes, it does.

TELEPHONE INDUSTRY PRODUCTIVITY PERFORMANCE AND ITS IMPLICATIONS FOR THE PACIFIC BELL PRICE CAP FORMULA

Prepared for
Pacific Bell

By

Laurits R. Christensen
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September 8, 1995

TELEPHONE INDUSTRY PRODUCTIVITY PERFORMANCE AND ITS IMPLICATIONS FOR THE PACIFIC BELL PRICE CAP FORMULA

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1 Purpose of Report

In its July 19, 1995 decision in I.95-05-047, the California Public Utilities Commission (CPUC) granted, in part, Pacific Bell's request to facilitate an expeditious review of the NRF structure. In the decision, the CPUC stated that three issues will be addressed in Phase I of the expedited proceeding. The purpose of my testimony is to address issue number 1: "Should GDP-PI minus X (inflation minus productivity factor) in the price cap formula be modified or eliminated?"

Pacific Bell has recommended that the current price cap mechanism for intrastate rates be eliminated. In response to that portion of Question 1 dealing with modification of the formula, I concur with Pacific Bell that if a price cap formula with a productivity offset is to be continued, the current productivity offset of 5 percent is too high. I concur that the offset should be no more than 2 percent because this is the long-term TFP growth differential between the national telephone industry and the overall economy.

In this report, I support the conclusion that the offset should be no more than 2 percent, based on the following major findings:

1. As the Commission recognized in D.94-06-011, a nation-wide industry measure of TFP is the appropriate measure to use in a price cap formula. The Commission also indicated that the long-awaited Bureau of Labor Statistics (BLS) measure of Local Exchange Carrier (LEC) industry TFP would be the ideal measure. But the BLS study has been delayed, and

its release date is uncertain. The study I have performed for the U.S. LEC industry in the FCC price cap proceeding is a close approximation to the anticipated BLS study.[1] The results of my LEC industry TFP study and other studies of the national telephone industry indicate a 2 percent long-term TFP growth differential between the telephone industry and the overall economy.

2. This differential has remained stable over time and shows no signs of increasing. There is no statistically significant time trend of an increasing TFP growth differential and, in particular, there is no evidence of the differential widening since divestiture.

3. Because the expected differential in input price growth between the telephone industry and the U.S. economy is zero, an input price differential term, or "W" factor, need not be included in the offset. The appropriate industry X factor is 2 percent, which includes both productivity and input price considerations.

4. The 2 percent offset is appropriate not only because it measures the conceptually appropriate and stable long-term industry-wide differential, but it also reflects the expected performance of Pacific Bell into the future. Pacific Bell's performance of the 1980's will likely not continue into the future because of the impact on the Company of the relatively

[1] Laurits R. Christensen, Philip E. Schoech, and Mark E. Meitzen, "Productivity of the Local Exchange Operating Telephone Companies Subject to Price Cap Regulation: 1993 Update," Christensen Associates, January 16, 1995. This study represents over 90 percent of the access lines in the U.S. local exchange industry.

weaker California economy and the effects of competition on Pacific Bell. Pacific Bell's output performance is likely to be more reflective of industry averages.

This report is organized in the following way. In Section 2, I develop the conceptual basis of the price cap formula. I explain that the offset to the inflation measure in the price cap formula (the "X factor") is conceptually composed of: the expected differential in productivity growth between the telephone industry and the economy; and the expected differential in input price growth between the telephone industry and the economy. Further, I demonstrate that the expected input price differential is zero and, therefore, need not be included in the offset. In Section 3, I explain the merits of using a nation-wide industry measure as the basis for the X factor if a price cap formula were continued for Pacific Bell. As I demonstrate, the study I have performed for the U.S. LEC industry in the FCC price cap proceeding is a close approximation to the anticipated BLS study. In Section 4, I present the results of my LEC industry TFP study and survey other studies of the telephone industry. **All studies indicate a stable 2 percent TFP growth differential between the telecommunications industry and the overall economy.** Section 5 demonstrates that the X factor should not contain an input price differential, since the evidence indicates there is no expected difference in growth between telephone industry and economy-wide input prices. Section 6 examines the performance of Pacific Bell and the California economy over the post-

divestiture period[2] and concludes that the current 5 percent is too high. If a formula-based price cap is continued, a productivity offset of 2 percent, based on the long term TFP growth differential between the U.S. telephone industry and the U.S. economy, will be a challenging offset for Pacific Bell.

2. Conceptual Basis of Price Cap Formula

The price cap formula has two basic ingredients: a measure of overall inflation, and an offset (the "X factor") to the inflation measure. Theoretically, the X factor incorporates: (1) the expected difference between the rate of telephone industry total factor productivity growth and the rate of economy-wide total factor productivity growth; and (2) the expected difference between the rate of telephone industry input price growth and the rate of economy-wide input price growth.[3]

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[2] Company-specific TFP growth was not among the factors examined.

[3] The following illustrates derivation of the theoretical X factor. In general, the rate of increase in output prices for the telephone industry (or any other industry) equals the rate of increase in input prices for the industry, less the rate of industry total factor productivity growth. In mathematical terms, this relationship can be expressed as:

$$(1) \qquad dP_{TEL} = dW_{TEL} - dT_{TEL}$$

where dP_{TEL} represents the rate of output price growth for the telephone industry, dW_{TEL} the rate of input price growth for the telephone industry, and dT_{TEL} the rate of total factor productivity growth for the telephone industry. For the U.S. economy this relationship also holds true:

$$(2) \quad dP_{US} = dW_{US} - dT_{US}$$

The GDPPI is an index of output prices for the U.S. economy. For the GDPPI to provide a good inflation index for telephone industry prices, it should be adjusted for differences between dT_{TEL} and dT_{US} and differences between dW_{TEL} and dW_{US}. This follows from subtracting equation (2) from equation (1) and rearranging the terms:

$$(3) \qquad dP_{TEL} = dP_{US} - (dT_{TEL} - dT_{US}) - (dW_{US} - dW_{TEL})$$

As I explain below, the best estimate of the expected difference between the rate of telephone industry total factor productivity growth and economy-wide total factor productivity growth is 2 percent per year. This is based on my recent study of the post-divestiture LEC industry, and the results of previous studies of telephone industry productivity. My research indicates that the best estimate of the expected difference between the rate of telephone industry input price growth and economy-wide input price growth, previously referred to in California as the "W" factor, is zero. Therefore, I believe the appropriate industry X factor is 2 percent, which includes both productivity and input price considerations.

3. Industry TFP is the Preferred Measure for the X Factor in a Price Cap Formula

The Commission concluded in D.94-06-011 that an industry measure of TFP is preferable to a company-specific measure of TFP:

> "We specifically rejected the proposal in the Phase II decision that "company-specific productivity factors be developed" and held that the productivity factor in the framework's indexing mechanism should be a differential productivity adjustment supported by information outside the utility's control. We believed then, as now, that a productivity factor

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Defining $X = (dT_{TEL} - dT_{US}) + (dW_{US} - dW_{TEL})$ and using GDPPI as the overall inflation measure yields the price cap formula:

(4) $dP_{TEL} = GDPPI - X$

Note that the term, $(dW_{US} - dW_{TEL})$, has been referred to in prior California proceedings as the "W" factor.